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Inhibitory Effect of Lactic Acid Bacteria on Uropathogenic Escherichia coli-Induced Urinary Tract Infections

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Abstract : The aim of this study evaluated the in vitro and in vivo antimicrobial activity of selected lactic acid bacteria (LAB) against Uropathogenic Escherichia coli (UPEC) for prevention and amelioration of UTIs. We screened LAB strains with antimicrobial effects on UPEC using a well-diffusion assay, bacterial adherence to the uroepithelium cell line SV-HUC-1 (BCRC 60358), and a coculture inhibition assay. The results showed that the 7 LAB strains (Lactobacillus paracasei, L. salivarius, two Pediococcus pentosaceus strains, two L. plantarum strains, and L. crispatus) and the fermented probiotic products produced by these multi-LAB strains exhibited potent zones of inhibition against UPEC. Moreover, the LAB strains and probiotic products adhered strongly to the uroepithelium SV-HUC-1 cell line. The growth of UPEC strains was also markedly inhibited after co-culture with the LAB strains and probiotic products in human urine. In addition, the enhanced levels of IL-6, IL-8 and lactic acid dehydrogenase were significantly decreased by treatments with the LAB strains and probiotic products in UPEC-induced SV-HUC-1 cells. Furthermore, oral administration of probiotic products reduced the number of viable UPEC in the urine of UPEC-challenged BALB/c mice. Taken together, this study demonstrates that probiotic supplementation may be useful as an adjuvant therapy for the treatment of bacterial-induced urinary tract infections.

Keywords : lactic acid bacterium, SV-HUC-1 uroepithelium, urinary tract infection, uropathogenic Escherichia coli, BALB/c mice
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